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(54) Racks for centrifuge tubes

(57) A holding rack for centrifuge tubes, which may be inserted into the pivoted cups of the rotor of a centrifuge and withdrawn for decanting, comprises vertically stackable members 1, 2, 3 formed with recesses for receiving the tubes 11, the members including cut-outs 15 which contain elastic securing elements 10 which fill a part of the space of the recesses 16 whereby the tubes are held fast by the gripping action of the elastic elements so that they cannot drop out of the rack accidentally even whilst tipping the latter.

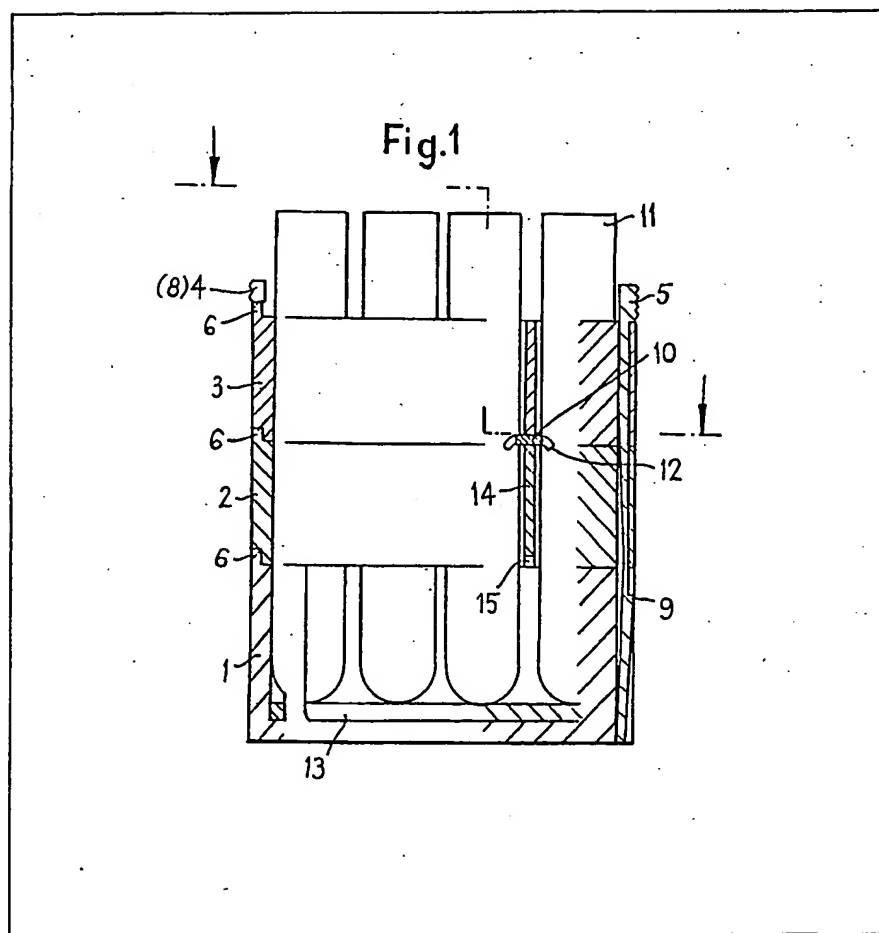


Fig.1

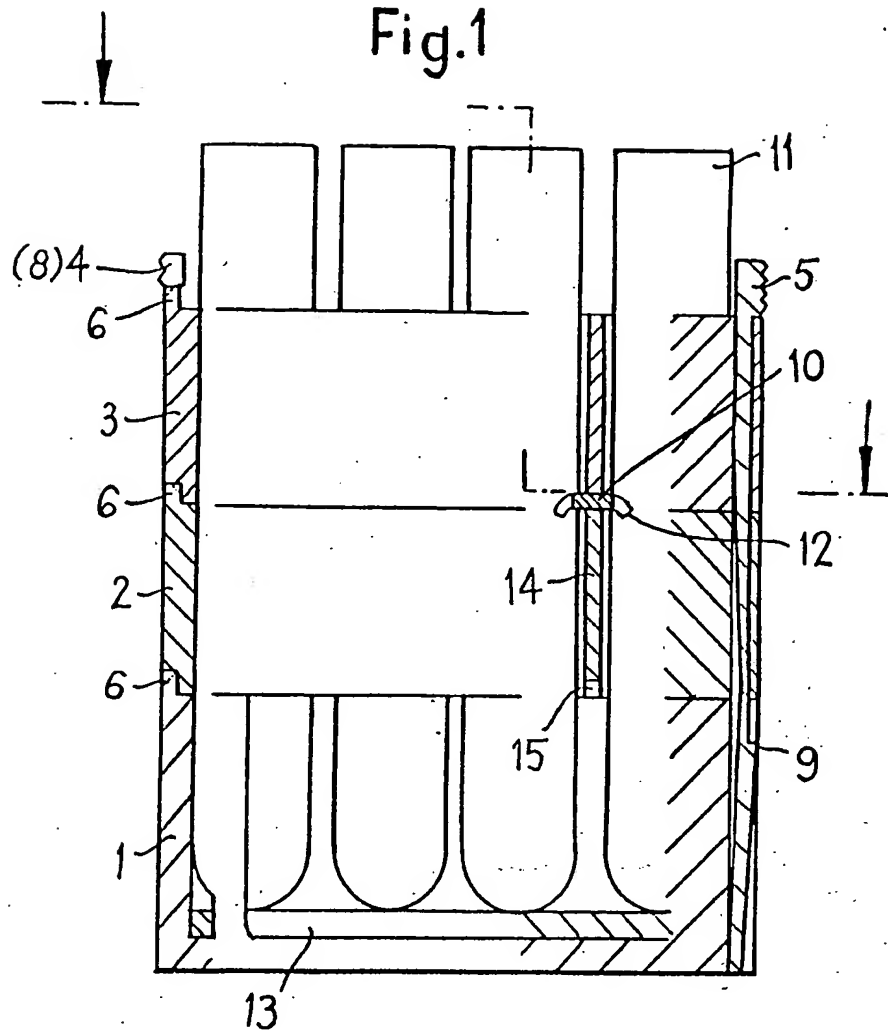
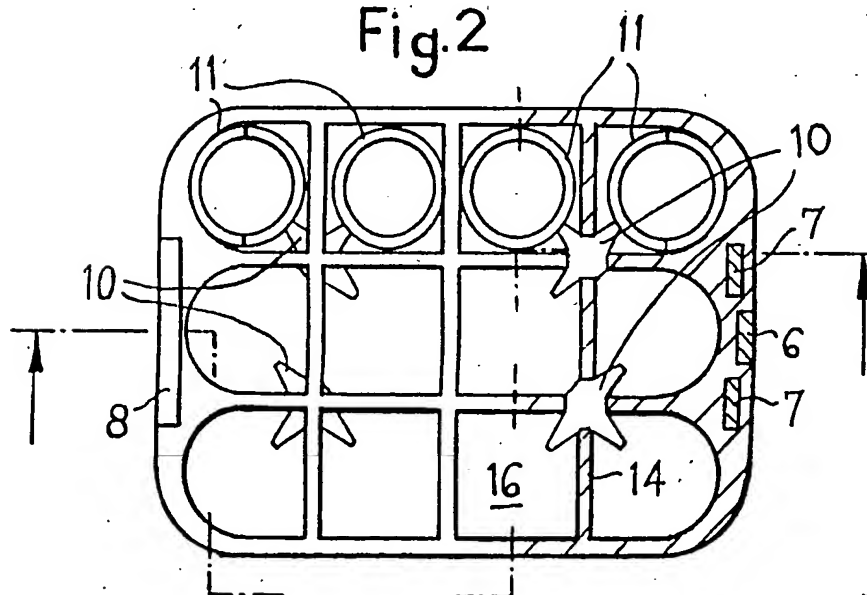


Fig.2



SPECIFICATION

Improvements in or relating to racks for centrifuge tubes

- 5 The present invention relates to racks for centrifuge tubes of the kind comprising recesses for a plurality of tubes, and formed in vertically-stackable members.

Holding racks of this kind have been known for many years - see for example German Specification No. OS 18 00 767 and scarcely any changes have so far been made as is evidenced by the teaching of United States Specification No. 4032066.

- 15 It is an object of the invention to provide uncomplicated and reliable means of securing a plurality of centrifuge tubes in a rack, in such manner that the tubes, which must be pivoted for emptying purposes, are held fast so securely in their axial direction, that they do not slip out during the pivoting of the rack.

Accordingly, the invention consists in a holding rack for centrifuge tubes of the kind comprising recesses for a plurality of tubes formed by vertically-stackable members, wherein said members include 25 cut-outs which contain elastic securing elements which, in appropriate number, shape and material, fill a part of the space of the recesses for the tubes, and wherein the tubes themselves are held fast by the gripping action of said elastic elements.

- 30 Other features of the invention will become apparent from a perusal of the specification and drawings to follow.

Apart from the great economy of the construction according to the invention, the main advantage 35 consists in the improved security during the simultaneous pouring out or decanting of the liquid contents of all the tubes of the rack.

In order that the invention may be more clearly understood, reference will now be made to the 40 accompanying drawings which show one embodiment thereof by way of example and in which:-

Figure 1 shows an embodiment of rack in partial axial section from the front, and

Figure 2 shows a partial cross-sectional plan view 45 of the rack.

Referring now to the drawings, the holding rack for centrifuge tubes, in particular glass tubes 11 as shown, comprises several plastics material parts which are preferably produced by the injection 50 moulding process, and is intended for insertion into the pivoted cups of a centrifuge rotor, which corresponds to the external outline of the racks. The rack comprises several vertically-stackable members comprising a base element 1, two identical grid plates 2 and 3, and two similar coupling elements 4 55 and 5. The members 1, 2 and 3 are preferably interimbricated.

Small upwardly projecting pegs 6 are situated on the top end sides of sidewalls of the base element 1 60 which is open at the front and rear, as well as on the end sides of the grid plates 2 and 3, and fit into matching notches in the underside of the grid plates 2 and 3 and thereby fix the base element 1 as well as the grid plates 2 and 3 against horizontal displace-

The base element 1 and the grid plates 2 and 3 each have two rectangular perforations in their narrow side walls, through which are inserted the two limbs 7 and 7' of the coupling elements 4 and 5. 70 These limbs 7 and 7' are interconnected by a web 8 at the top. The limbs 7 and 7' taper downwardly and have projections 9 which engage resiliently below the underside of a corresponding rebate in the base element 1, thereby establishing a mechanical integrity between the base element 1 and the grid plates 2 75 and 3 (see Figure 1).

In contradistinction to the cylindrical shape of the receiving holes for centrifuge tubes in known tube racks, the recesses 16 of the rack according to the 80 invention described herein have a generally rectangular cross-section, which makes it possible to use the tube rack with star-shaped rubber plates 10 which are inserted into four cut-outs 15 present in the underside of the grid plates, and between the 85 grid plates 2 and 3. In this embodiment, the recesses are square when tubes 11 are inserted as shown in the rear row of recesses, the tips 12 of the plates 10 are in contact with the tubes 11. There is sufficient room for the tips of the stars to be deformed as 90 shown within the space between the cylindrical tubes and the corners of the square recesses.

The contact between the tubes and the tips of the stars is adequate on the one hand to prevent the tubes from slipping out of the rack during decanting, 95 and on the other hand, the tubes may be inserted and withdrawn whilst using but little force. The star-shaped rubber plates are so formed and inserted that at least one star apex is situated in each recess.

100 In a second embodiment, which is not illustrated, and is intended for thinner tubes and comprises four rows of five tubes, rubber plates comprising three and four star tips are used.

The construction of grid plates comprising square 105 recesses also has the advantage that less material is required for their manufacture, and further more that the more uniform wall thicknesses eliminate problems in respect of points of collapse.

The lesser weight of the racks results in lower 110 centrifugal stressing of the centrifuge rotor and of the pivoted cups, and furthermore leads to shorter run-up and run-down periods upon starting and braking the centrifuge.

A rubber plate 13 is incorporated in known manner 115 to reduce the stress on the base of the tubes. The vertical walls of the plates 2, 3 are indicated at 14.

The upwardly projecting webs 8 of the coupling elements 4 and 5, by which the rack is generally handled, are provided with a milled pattern.

120 Certain modifications may be made to the embodiments described without in any way departing from the scope of the invention.

In particular, the shape of the recesses 16 for the tubes 11 is not restricted to a square in cross-section, 125 since it is also possible on the contrary to select a shape and size differing from the external outline of the tubes, e.g. rectangular, polygonal or the like, which renders it possible to arrange the elastic securing elements to project at least partially into

CLAIMS

1. A holding rack for centrifuge tubes of the kind comprising recesses for a plurality of tubes formed
5 by vertically-stackable members, wherein said members include cut-outs which contain elastic securing elements which, in appropriate number, shape and material, fill a part of the space of the recesses for the tubes, and wherein the tubes themselves are
10, held fast by the gripping action of said elastic elements.
2. A holding rack as claimed in claim 1, wherein at least one elastic securing element is arranged to project into the space of each said recess.
- 15 3. A holding rack as claimed in claim 1 or 2, wherein the elastic securing elements consists of an elastomer such as rubber.
4. A holding rack as claimed in claim 1, 2 or 3, wherein the elastic securing elements are of approximately star-shape and are located in the corners of
20 the recesses for the tubes.
5. A holding rack as claimed in any of the preceding claims, wherein the recesses for the tubes have a square cross-section.
- 25 6. A holding rack as claimed in any of the preceding claims, wherein the elastic securing elements are inserted into the cut-outs of the interlocked vertically-stackable members and the cut-outs are present in the vertical walls of said members at the
30 corners of the recesses.
7. A holding rack as claimed in claim 6, wherein the stackable members are interimbricated.
8. A holding rack substantially as hereinbefore described with reference to the accompanying draw-
35 ings.

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